APPENDIX A

Glossary

A

Acaricide. A chemical agent used to control tick populations.

Acid. A substance that donates hydrogen ions that can be accepted by a base. *Contrast with* **Base**.

Aerobic. Living, growing, and reproducing in an environment with air or oxygen present. E.g., aerobic bacteria. *Contrast with* **Anaerobic**.

Air-reactive. Likely to react rapidly or violently with dry or moist air. May apply to the toxic and corrosive fumes generated when a chemical is exposed to air.

Alicyclic compound. An alkane with one or more rings of carbon atoms. The properties of alicyclic compounds closely resemble the properties of alkanes.

Alkali. A general description given to strong bases, including the hydroxides and carbonates of the "alkali metal" or group 1A of the Periodic Table. Examples include sodium hydroxide, potassium hydroxide, etc. A synonym for the strong alkalis is **caustics**.

Alkali metal. The univalent metals of Group 1A of the periodic table (lithium, sodium, potassium, rubidium, cesium, and francium), which are all strongly corrosive in the presence of moisture.

Alkaline. Having a high concentration of hydroxide ions in aqueous solution (i.e., a high pH). Strongly alkaline aqueous solutions are very corrosive to skin, metal, and other materials. *See also* **Base**.

Alkaline-earth. Any of the three divalent elements of Group IIA of the periodic table (barium, calcium, and strontium).

Alkane. An organic compound that contains only hydrogen and carbon and has only single bonds.

Alkene. A hydrocarbon that contains at least one carbon-carbon double bond. *See also* **Hydrocarbon**.

Alkyne. Hydrocarbons that contain at least one carbon-carbon triple bond. *See also* **Hydrocarbon**.

Allotrope. An element that can exist in different physical forms, depending on the conditions under which it forms. For instance, oxygen is an allotrope that can be either diatomic (O_2) or triatomic (O_3). The triatomic form requires high energy. Carbon is also an allotrope that, under intense pressure and heat, forms diamond, but in less energetic environments, forms graphite and carbon black.

Alloy. Metals formed as mixtures or solutions (either liquid or solid). Some alloys include nonmetal substances in order to improve particular physical characteristics of that alloy. For instance, hardened steel includes a small percentage of carbon.

ALOHA. Areal Locations Of Hazardous Atmospheres. CAMEO's toxic gas dispersion model, used to estimate the extent of the area downwind of a chemical release within which chemical concentrations at or near ground level might be dangerously high.

Amalgam. An alloy of mercury, usually in combination with another metal, e.g., zinc, but sometimes with a nonmetal. Amalgams are used very commonly in dentistry.

Amorphous. *Lit.* "without shape." A substance that lacks structure. Generally, amorphous solids lack three-dimensional crystal structure. Most liquids are amorphous, with exceptions such as liquid water, which is highly structured.

Anaerobic. Living, growing, and reproducing in an environment without air or oxygen. E.g., anaerobic bacteria. *Contrast with* **Aerobic**.

ANFO. Ammonium nitrate-fuel oil mixtures used in commercial explosives.

Anhydrous . *Lit.* "without water." A substance that has no water associated with it in the form of hydrate or water of crystallization. Examples include anhydrous ammonia and aluminum chloride.

Anion. An atom or group of atoms having a negative net charge. *Contrast with* **Cation**.

Antioxidant. A chemical substance that reduces the tendency of oxygen to chemically combine with hydrocarbons in commercial products such as vegetable oils, rubber, petroleum products, and animal fats. These antioxidants are organic compounds added to mixtures in low concentrations.

Aphidicide. A chemical agent used to control aphid populations.

Aqueous. Consisting largely of water or dissolved in water.

Aromatic compound. An unsaturated organic compound containing one or more rings of carbon atoms in which single and double bonds alternate.

Asphalt. Usually considered the residual of petroleum distillation, asphalt forms a thick, black, viscous mixture of heavy hydrocarbons. Used on road surfaces, for roofing, and in waterproofing sealants and other products.

Asphixiant. A gas that is non-toxic but may kill if it accumulates in a confined space and is breathed at high concentrations, because it drives out oxygen-containing air.

Autoignition temperature. Or ignition point. At some minimum temperature, a substance will catch fire in the absence of an ignition source such as a flame or spark. That temperature is the substance's autoignition temperature.

Autoxidation. The tendency of oxygen to chemically combine with hydrocarbons in commercial products such as vegetable oils, rubber, petroleum products, and animal fats.

Azo dye. A group of dye stuffs widely used for dyeing natural and synthetic fibers as well as nontextile materials. The dye molecule always contains double-bonded nitrogen atoms in the color-imparting portion of the molecule.

B

Base. A substance that accepts hydrogen ions donated by an acid. *Contrast with* **Acid**.

Bile. Or bile acids. A complex mixture of organic compounds secreted by the liver primarily to emulsify fats and oils for their ultimate digestion.

Binary reaction. A reaction between two chemicals. CAMEO predicts the results of binary reactions only. When more than two chemicals are mixed, CAMEO predicts reactions between all possible pairs of those chemicals (but not the reaction of all chemicals together).

Blowing agent. A compound employed in the production of foamed plastics, food products, or rubber, which produces or evolves an inert gas such as carbon dioxide or nitrogen during production. A prime example is sodium bicarbonate, which is used in sponged rubber, plastics, and bread, and other baked food products.

Boiling point. The maximum temperature at which the liquid phase of a substance exists in equilibrium with its vapor phase. Above the boiling point, a liquid vaporizes completely. At its boiling point, the vapor pressure of a liquid is equal to the atmospheric pressure on it.

Brass. An alloy containing copper and zinc in various proportions.

Bronze. An alloy containing copper and tin in various proportions. Various bronze mixtures also include small percentages of aluminum, silicon, and phosphorus.

C

CAMEO. *See* **Computer-Aided Management of Emergency Operations (CAMEO)**.

CAMEO Map. A MARPLOT map designed to hold all CAMEO-related objects, such as (a) symbol objects representing chemical facilities or special locations, and (b) polyline objects representing routes along which hazardous materials are transported.

Camphor. A natural product derived from the distillation of a wood found chiefly in Taiwan. It is a ketone that has a very characteristic pungent, penetrating odor. Camphor also is synthesized by reaction of pinene in a sequence of chemical reactions.

Carbohydrate. A large class of organic compounds that comprise the basic components of plant tissues. They include single sugar molecules and the more important polymers, starches and cellulose. Carbohydrates are composed of carbon, hydrogen, and oxygen.

Carbon black . An amorphous form of carbon.

Carcinogen. Capable of causing cancer.

CAS number. (CAS #) Chemical Abstract Service Registry number. This chemical identification number, in the format XXX-XX-X, is assigned by the American Chemical Society.

Catalyst. A substance that speeds up (catalyzes) a chemical reaction between other substances without itself being chemically changed or consumed. Catalysts are widely used in the chemical industry. For example, an iron/aluminum catalyst is used to synthesize ammonia and a platinum catalyst is used to manufacture nitric acid. *Compare with* **Initiator**. *Contrast with* **Inhibitor**.

Catalyze. To act as a catalyst.

Cation. An atom or group of atoms having a positive net charge. *Contrast with* **Anion**.

Caustic. Strongly basic, with high pH. Very corrosive. *See also* **Base**.

Cellophane. A form of the polymer cellulose, altered to have a clear appearance, and used in packaging.

Cellulose. A carbohydrate polymer that is the abundant cellular matrix found in all plant tissues. Cellulose is a complex polysaccharide.

Ceramics. Any of various substances derived from earthen materials such as clays, silicates, and sand. Ceramics are used in great quantity in industrial applications, such as household structural products, pottery, and so on.

CERCLA. The Comprehensive Environmental Recovery, Compensation, and Liability Act of 1980. This law authorized the "Superfund" trust fund to provide funding for hazardous substance cleanup and for emergency response.

Chelate. The organic portion of a complex composed of a metal atom bonded to nonmetal atoms on the organic portion. Such complexes are extremely important because they form the essential active site in enzymatic or catalytic reactions in nature and in synthetic reactions.

Child module. A module that is below another, related module in CAMEO's file heirarchy. Chemicals in Inventory is a child module relative to the Facilities and Routes modules.

Chronic. Of long duration, or frequently recurring. Chronic health effects become apparent and/or continue for some time after exposure to hazardous chemicals. *See also* **Delayed**.

Combustible. Having a flash point above 143° F (62°C). Substances are considered combustible unless they are stated to be non-combustible.

Combustion. Also **burning**. A chemical reaction between oxygen and another element or compound that is rapid and exothermic enough to generate heat and light.

Commission. The State Emergency Response Commission, or the Governor if there is no commission, for the State in which a facility is located. *See* **State Emergency Response Commission (SERC)**.

Committee. The Local Emergency Planning Committee (LEPC) for the emergency planning district in which a facility is located. *See* **Local Emergency Planning Committee (LEPC)**.

Compound. The combination of two or more elements into a distinct chemical material.

Computer-Aided Management of Emergency Operations (CAMEO). A software program developed by NOAA and EPA. CAMEO supports a number of information management functions, including retrieval of chemical specific information to support emergency response activities, threat zone calculation and plotting for risk assessment, organization and management of EPCRA information, and storage and computer display of area maps.

Concentration. The amount of any substance present in a specified weight or volume of a mixture. In the CAMEO context, concentrations usually relate to the amount of a substance mixed in air or water.

Condensation. A reaction in which two molecules combine to form a larger molecule as a small molecule is split out. The condensation polymerization of amino acids into proteins occurs with the splitting out of water. Also, the change of water or other substances from vapor to liquid phase.

Contaminant. The presence of a foreign and perhaps deleterious material in an otherwise pure material. Often synonymous with pollutant. In small quantities, may raise the rates of normal chemical reactions very rapidly, sometimes causing harmful effects. *Compare with* **Impurity**.

Copolymer. Or **polyblend**. A polymer generated when two or more different monomers join to form a macromolecule. The copolymerization process is often employed to produce elastomers with very specific physical properties.

Corrosive. Having the quality of eating away or consuming by chemical action.

Covalent bond. A chemical bond in which atoms of either like or unlike elements link by sharing electrons.

Cryogenic. Matter at extremely low temperatures, usually approaching absolute zero (obtainable only by employing the liquefied gases hydrogen, helium, oxygen, and nitrogen).

Cyclic compounds. An organic compound that contains one or more closed carbon ring structures.

D

Database. An organized collection of information, usually in an electronic format. Each of CAMEO's modules is a database. Each record in a database describes an important element of information. E.g., each record in the Chemical Library describes a particular substance. Each database record is composed of datafields, each of which stores a particular kind of information (e.g., Chemical Name is a data field on a Chemical Library record). *See also* **Module**.

Data field. Or **Field**. An area within a record in a CAMEO module where a specific kind of information is stored (e.g., the name of a facility, or a phone number). *See also* **Database**.

Deflagration. Rapid, sharp combustion with sudden evolution of flame.

Delayed. A hazard category that includes carcinogens and other hazardous chemicals, defined in 29 CFR § 1910.1200, that adversely affect a target organ. Such effects generally result from long-term exposure and are of long duration. *See also* **Chronic**.

Deliquescent. The property of becoming liquid by absorbing moisture from the air.

Denature. The addition of a toxic material such as benzene or methyl alcohol (a **denaturant**) to ethyl alcohol to inhibit or prevent its use for human consumption.

Density. The ratio of weight to volume of any substance. Assume any density value shown in CAMEO was measured at 77°F (25°C), unless stated otherwise.

Detergent. A natural or synthetic agent that suspends emulsified oils, greases, and fats in solution and, by doing this, acts as a cleaning agent. Examples of detergents include soaps and various alcohols, sulfonated organics like dodecylbenzene, and various alkylates.

Detonation. The very rapid decomposition of an explosive material, which produces a rapidly-propagating, high-pressure wave traveling at supersonic speeds.

Dialog box. Or **dialog**. A window that a computer program presents to you, in which you enter information or choose options. For example, you set up a search in CAMEO's search dialog box.

Dispersion. The movement of molecules or finely divided particles through a gaseous or liquid medium. For example, the distribution of a toxic chemical cloud in the atmosphere.

Distillation. The process of separating a mixture of materials by heating and then condensing the resulting vapors. The separation is made possible by the inherent differences in boiling point among the individual mixture components (each can be distilled out of the mixture at a particular temperature).

E

Efflorescent. Tending to lose moisture to the air as shown by the formation of a powder on the surface.

EHS. *See* **Extremely Hazardous Substances (EHS)**.

Elastomer. Any of a group of rubber-like polymers that have essentially the same properties as natural rubbers.

Electrolyte. In a battery, the material that acts as a conductor of electric current between the dissimilar metal electrodes. These are ionically-bonded, inorganic salts that form ions in solution and thus increase electrical conductivity.

Electrons. Negatively-charged elementary particles that have a very small mass. Electrons are components of all atoms; they are readily lost or gained by atoms. (*See* **Ion**.) The transfer and sharing (redistribution) of electrons among atoms is the basis of chemical change.

Electrophile. A chemical reactant that tends to react at centers of negative charge.

Electroplating. For corrosion protection or decorative purposes, an electrodeposition process that coats a surface with a thin film of metal (or plastic), by creating an electrolytic cell in which metal atoms are deposited on the cathode and the anode acts as the reservoir of ions in solution.

Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Also known as Title III of SARA (the Superfund Amendments and Reauthorization Act of 1986). EPCRA establishes requirements for Federal, state, and local governments, and for industry for emergency planning and "community right-to-know" reporting on hazardous and toxic chemicals. See "EPCRA" on page 266.

Emergency Planning and Community Right-to-Know Information Hotline. Operated by the EPA to provide communities with help in preparing for accidental releases of toxic chemicals. The hotline number is 1-800-535-0202.

Emergency Response Planning Guideline. *See* **ERPG**.

Emulsification. Generally, either the dispersion of oil particles in water or water in oil. The emulsification process is relatively permanent, and may proceed with the help of an emulsification agent.

Endothermic. A chemical reaction that must absorb heat from its surroundings in order to proceed. *Contrast with* **exothermic**, in which heat is produced by the forward reaction.

Enzyme. Any of a number of complex proteins that act in extremely specific chemical reactions to

accelerate reactions or catalyze a specific reaction. The rates of reaction are often many orders of magnitude faster than the rates for the same reaction at standard temperature and pressure conditions. All metabolic processes in living organisms are governed by enzymes.

EPA. U. S. Environmental Protection Agency. (website: www.epa.gov)

EPCRA. *See* **Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)**.

ERPG. Emergency Response Planning Guideline. Three-tiered public exposure guidelines developed by a committee of the American Industrial Hygiene Association. The ERPGs were developed as planning guidelines, to anticipate adverse human health effects caused by exposure to toxic chemicals. *See also* **TEELs**.

ERPG-1. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor. *See* **ERPG**.

ERPG-2. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action. *See* **ERPG**.

ERPG-3. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects. *See* **ERPG**.

Exothermic. A term used to describe the generation of heat from a chemical reaction. *Contrast with* **endothermic**, in which heat is taken in from the surroundings.

Explosion. A chemical or physical process in which the rate at which energy is being generated exceeds its ability to escape to its surrounding environment. The hazards of an explosion can include a shock wave, especially near the point of explosion, and projectiles generated by the shock wave.

Explosion limits. *See* **Flammability limits**.

Explosive. A material synthesized or mixed deliberately to allow the very rapid release of chemical energy. Also, a chemical substance that is intrinsically unstable and liable to detonate under conditions that might reasonably be encountered.

Extremely Hazardous Substances (EHS). EHS chemicals have been identified by the U.S. Environmental Protection Agency as particular toxic threats. They are listed under EPCRA in the appendices to 40 CFR § 355, Emergency Planning and Notification.

F

Facility. Defined in Section 302 of EPCRA as all buildings, equipment, structures, and other stationary items located on a single site or on contiguous or adjacent sites and which are owned or operated by the same person (or by any person who controls, is controlled by, or under common control with, such person). For purposes of emergency release notification, the term also includes motor vehicles, rolling stock, and aircraft.

Fermentation. An energy-yielding reaction carried out in an anaerobic environment (without oxygen), catalyzed by enzymes (biochemical catalysts) and involving the decomposition of carbohydrates (sug-

ars and starch) to form alcohols, carboxylic acids, and carbon dioxide.

Field. *See* **Data field**.

Fire hazard. A hazard category that includes chemicals described as flammable, combustible liquid, pyrophoric, or oxidizers (as defined by 29 CFR § 1910.1200).

Flammability. A substance's tendency to ignite or take flame. Flammability is closely related to the volatility of a substance (and is not its relative ability to burn in the presence of oxygen with the evolution of heat). *See* **Flammability limits** and **Flash point**.

Flammability limits. Or **explosive limits**. The **lower flammability limit** is the lowest concentration of a vapor in air that catches fire when exposed to a source of ignition. The **upper flammability limit** is the highest concentration of the vapor in air that catches fire when exposed to a source of ignition. The flash point and lower and upper flammability limits of a substance are often used as measures of its flammability hazard in a given situation.

Flammable. Having a flash point lower than 143° F (62°C) and greater than 100°F (38°C).

Flash point. The lowest temperature to which a substance must be heated before the vapor-air mixture above it will be ignited by a free flame in the open air.

Fluorescence. A luminescent (light-emitting) quality of an organic dye or inorganic substance. In fluorescent substances, light emission continues only as long as the excitation energy lasts. Differs from phosphorescence, in which light emission lasts for many seconds or even hours after excitation occurs. Also, in fluorescence, excitation generally is immediately followed by emission of energy, while in phosphorescence, energy emission may be delayed.

Footprint. Or cloud footprint. The area downwind of a chemical release point where ALOHA predicts that the level of concern (LOC) will be reached or exceeded at some time during the hour after the release begins. ALOHA's footprints can be displayed on MARPLOT maps. *See also* **Level of Concern**.

Found set. A found set is created in a CAMEO module in one of three ways: (1) when you search the module, records that meet your search criteria are placed in a type of found set also called a **search collection**; (2) when you choose a command from the Show Related submenu of the Record menu, the records related to the current record are placed in a found set in the related module; (3) when you select map objects, then select Get Info, records linked to those objects are placed in a found set. Whenever a found set exists in a CAMEO module, only the records in the found set are shown in List view. To clear a found set, select Show All Records from the Record menu. *See also* **Search collection**.

Free radical. A molecule in which a portion is highly reactive because chemical bonds have been ruptured by thermal radiation from combustion or ionizing radiation. Conceptually, a free radical molecule contains sites with an unpaired electron available to attack other molecules. Free radicals often are involved in chain reaction-type mechanisms, such as combustion processes and the industrial processes used to make polymers.

Friedel-Crafts Reaction. A chemical reaction in which anhydrous aluminum chloride or a similar metallic halide acts as a catalyst to promote either the condensation reaction between ethyl chloride and benzene to form ethyl benzene, or the manu-

facture of products such as acetophenone from acetyl chloride and benzene.

Fumigant. A liquid, gas, or solid pesticide applied as a vapor or gas indoors or in a restricted area. Some typical fumigants are sulfur dioxide (protects grains), chlorine dioxide (kills anthrax), and hydrogen cyanide (protects tree crops).

Fuming. Describes the release of fumes by highly active inorganic liquids such as nitric acid; the fumes form a noxious vapor cloud. Nitric, sulfuric, and hydrofluoric acids and similar acids produce very dangerous levels of fumes when they are in their pure state. The presence of water somewhat reduces the production of fumes.

Fungicide. A substance that kills or inhibits the growth of spores and fungi.

G

Glacial. A term used for certain acids, such as acetic or phosphoric acid, indicating a very pure form of the acid with a freezing point just below room temperature.

H

Hazard category. Five categories of hazardous chemicals are defined in 29 CFR § 1910.1200. They include immediate (acute) and delayed (chronic) health hazards, as well as fire, sudden release of pressure, and reactive hazards. CAMEO's Chemicals in Inventory records contain checkboxes for all of these hazard categories.

Hazardous chemical. Any chemical that is a physical or health hazard as defined in 29 CFR § 1910.1200(c).

Hazardous material. Any substance or material in a quantity or form that may be harmful to humans, animals, crops, water systems, or other elements of the environment, if accidentally released. Hazardous materials include: explosives, gases (compressed, liquefied, or dissolved), flammable and combustible liquids, flammable solids or substances, oxidizing substances, poisonous and infectious substances, radioactive materials, and corrosives.

Hazardous Materials Emergency Planning Guide. Informally known as the "orange book" or "NRT-1." A publication of the National Response Team; describes a comprehensive approach to planning for hazardous material incidents. See "Bibliography" on page 276.

Hazardous substances. Substances designated as hazardous under CERCLA. CERCLA includes substances listed under the Clean Water Act, the Clean Air Act, the Resource Conservation and Recovery Act (RCRA), and the Toxic Substances Control Act (TSCA) Section 7. *See also* **CERCLA**.

Hazards analysis. A systematic method for evaluating the potential hazard to a community from accidental airborne releases of hazardous chemicals stored, transported, manufactured, or used within that community. *See also* **Technical Guidance**.

Heat of combustion. The heat generated when a substance is completely oxidized to product gases such as sulfur dioxide, carbon dioxide, and nitrogen dioxide.

Heat of crystallization. The heat evolved when a crystal is formed from a saturated solution of a substance.

Heat of dilution. The heat evolved when a solution is diluted from one concentration to a lower concentration.

Heat of hydration. The heat evolved when ions in solution are hydrated. That is, the heat produced when the hydrate of a substance is formed. *See also* **Hydration**.

Heat of reaction. The heat evolved during a chemical reaction.

Hemoglobin. An iron-containing protein molecule. Hemoglobin is a characteristic component of red blood cells, which carries oxygen to the tissues of the body.

Herbicide. A chemical agent used to control weeds or nuisance plants.

Heterocyclic. A cyclic organic compound that is unsaturated and contains one or more atoms other than carbon as part of its ring structure. Oxygen and nitrogen are most often the elements that occupy the positions within the ring structure. *See also* **Unsaturated**.

High explosive. Or primary explosive. An explosive that is readily detonated by heat, friction, or shock. High explosives vary widely in their sensitivity to these forms of initiating energy.

Highly flammable. Designation applying to (a) substances with flash points below 100°F, and (b) mixtures that include substances with flash points below 100°F. Materials designated as highly flammable include pyrophoric solids and substances that present an exceptional flammability hazard, in that they may suddenly and dangerously increase the intensity of a fire.

Humidity. The ratio of the amount of water vapor being held in the air at any given temperature to the maximum that can be held in the air at that temperature.

Hydration. Or **solvation**. The association of molecules of water with inorganic substances, usually salts, to form **hydrates**. Also refers to the strong affinity of water molecules for ions in aqueous solution.

Hydrocarbon. An organic compound containing only hydrogen and carbon.

Hydrogen ion. A hydrogen atom that has lost its single electron and consequently has a positive charge. Water (H_2O) can be thought of as a combination of hydrogen ion (H^+) and hydroxide ion (OH^-).

Hydrolysis. A chemical reaction in which a bond is broken by the agency of water. A hydrogen ion and hydroxide ion from the water become independently attached to the two atoms previously linked.

Hydrolyze. To break down by means of reaction with water.

Hydronium ion. An ion with the formula H_3O^+, formed by the transfer of a hydrogen ion from one water molecule to another.

Hydrophilic. *Lit.* "Water-loving." Refers to substances that attract and retain water, and to wettable solids whose surfaces readily attract water.

Hydrophobic. *Lit.* "Water hating." Refers to substances that repel water and are not easily wetted or emulsified (fats, waxes, oils, metal powders, and many inorganic compounds).

Hydroxide ion. An ion with an overall negative charge, composed of a single oxygen and a single hydrogen atom. Water (H_2O) can be thought of as a combination of hydrogen ion (H^+) and hydroxide ion (OH^-).

Hygroscopic. Capable of readily absorbing moisture from the air, so as to swell up, contract in length, or change form or consistency.

Hypergolic. Igniting spontaneously on contact with another substance, which is typically an oxidizing agent.

I

IDLH. The Immediately Dangerous to Life or Health (IDLH) value represents the maximum airborne concentration of a chemical to which a healthy adult worker can be exposed and escape without suffering irreversible health effects or symptoms that impair escape (ranging from runny eyes that temporarily impair eyesight to a coma). IDLH values are derived primarily from mammalian toxicity studies.

Ignition point. *See* **Autoignition temperature**.

Immediate (acute) hazard. A hazard category that includes highly toxic, toxic, irritant, sensitizer, corrosive (as defined by 29 CFR § 1910.1200), and other hazardous chemicals that cause an adverse effect to a target organ. Such effects usually develop rapidly, result from short-term exposure, and are of short duration.

Immiscible. Substances of the same phase (liquid or solid) that cannot be mixed in any proportion with one another. *Contrast with* **Miscible**.

Impurity. Usually, a very small amount of a foreign or extraneous substance that naturally or by accident exists in a substance. Many cases have been documented in which unintended impurities caused severe consequences during a chemical reaction process (often, processes such as polymerization reactions in which a small amount of impurity acted as a catalyst to initiate a runaway reaction). *See also* **Contaminant**.

Inert. Non-reactive in nature. Refers to substances that have little or no chemical activity or affinity. Some of the best-known inert substances are the noble gases such as helium and neon.

Ingestion. A route of chemical exposure in which a toxic material is brought into the bloodstream by entering the digestive tract.

Inhalation. A route of chemical exposure in which a toxic material is brought into the bloodstream as particles or volatile compounds breathed into the lungs and nasal passages.

Inhibitor. Substance that acts to retard or slow the rate of a chemical reaction. Probably the most important inhibitors are the antioxidants, which slow the oxidation of many types of materials such as rubber and food products. *Contrast with* **Catalyst**.

Initiating explosive. Primary explosives that are shock sensitive and cause the detonation of less sensitive explosives. Examples include the metal azides and mercury fulminate, along with many others.

Initiator. A substance that, because of its unusual chemical activity, may induce chemical reaction in other substances. Reactions such as polymerization, oxidation (formation of peroxides), and detonation (rapid combustion) are aided by initiators. *Compare with* **Catalyst**.

Inorganic. Compounds that do not contain the element carbon, as well as the following carbon-containing compounds: the carbon oxides, the carbides, carbon disulfide, phosgene, cyanides of metals, and carbonyl sulfide. *Contrast with* **Organic**.

Insecticide. A chemical substance that is lethal to various insects, generally by ingestion or body contact.

Inventory form. The Tier I and Tier II emergency and hazardous chemical inventory forms described in 40 CFR § 370.4. (See "Sections 311 and 312: community right-to-know requirements" on page 270.) Data fields on records in CAMEO's Chemicals in Inventory module resemble the data fields on Tier II forms. *See also* **Tier II**.

Ion. An atom or group of atoms that has an overall non-zero electric charge (which may be either negative or positive).

Irradiation. The impingement of radiation of a specific wavelength on a substance to initiate a chemical change.

Isomer. Compounds sharing the same molecular weight and molecular formula, but having different chemical structures. The difference in structure often causes differences in chemical and physical properties such as boiling point, melting point, and water solubility. Property differences among isomers produce differences in their reactivity and toxicity.

Isotope. Elements that are otherwise identical but that have different weights because they have different numbers of neutrons in their nuclei. The simplest example is the isotopes of hydrogen, including H^1, normal hydrogen, and H^2, or deuterium, which has an additional neutron.

L

Lachrymator. Irritating to the eyes in a way that induces tears. Tear gas is a lachrymator.

Lacquer. A fast-drying, organic coating material.

LEPC. *See* **Local Emergency Planning Committee (LEPC)**.

Level of Concern. *See* **LOC**.

Lignin. An amorphous organic polymer that helps bind cellulose fibers together in plant tissue.

Link. Either a connection between a CAMEO record and a related object on a MARPLOT map, or a connection between a chemical name shown on Chemicals in Inventory record(s) and a Chemical Library record.

Liquor. Any one or more compound mixtures in aqueous phase.

List view. View of a CAMEO module in which records in the module are displayed as a list. Double-clicking any record in the list displays that record in Record view. *Contrast with* **Record view**.

Litmus. A substance or material that, on contact with another substance, indicates that substance's pH or hydrogen ion concentration. Examples include litmus paper and pH indicator solutions. *See also* **pH**.

LOC. Level of Concern. A threshold concentration used for estimating the extent of the threat zone from a potential chemical release. A **threat zone** encloses the area within which concentrations reach or exceed a specified LOC. *See also* **Threat zone**.

Local Emergency Planning Committee (LEPC). A committee appointed by the State Emergency Response Commission (SERC), as required by EPCRA, first to design, then to regularly review and update a comprehensive emergency plan for an emergency planning district. See "Section 301-303: emergency planning" on page 268.

Lower explosive limit (LEL). Or **lower flammability limit**. The lowest concentration of a flammable vapor in air at which explosion or combustion can occur. *See also* **Upper Explosive Limit (UEL)**.

Luminescence. The phenomenon in which a substance that has absorbed radiant excitation energy emits radiation on return from some excitation state to its ground state energy.

M

MARPLOT. Mapping Application for Response, PLanning, and Operational Tasks. MARPLOT is the electronic mapping program included in CAMEO.

Material Safety Data Sheet (MSDS). A worksheet containing information about a hazardous chemical in the workplace. MSDSs are submitted by facility owner/operators to meet the chemical inventory reporting requirements of EPCRA. Under 29 CFR §1910.1200, facilities must develop an MSDS for each hazardous chemical present on site. See "Sections 311 and 312: community right-to-know requirements" on page 270.

Melting point. Also **freezing point**. The temperature at which the solid and liquid phases of a substance exist in equilibrium. Depends on chemical composition and applied pressure.

Metallurgy. The scientific study of the process of obtaining metals (mining), and the properties and uses of metals.

Mineral. The inorganic constituents of the earth's crust. Most minerals have a definite internal structure and chemical composition.

Miscible. The degree to which one substance can be mixed with another (usually, related to the degree to which a solute may mix in a particular solvent). Some materials, such as gases generally as well as ethyl alcohol in water, are completely miscible with one another in any proportion. *Contrast with* **Immiscible**.

Mixture. A uniform or nonuniform blend of two or more substances. Examples include blood, milk, petroleum products, and alloys.

Module. Any of the databases included in CAMEO. E.g., Facilities, Chemical Library, Contacts. *See also* **Database**.

Molar. A concentration expressed as the number of gram molecular weights of a solute mixed into one liter of solvent, usually water. A 1-molar solution of sodium hydroxide contains 40 grams of sodium hydroxide in each liter of water.

Molecular Weight. The sum of the weights of all the atoms in a molecule.

Molecule. A chemical entity composed of one or more elements in the form of atoms.

Molluscicide. A chemical agent used to control snail populations.

Monomer. One of the molecules that link together to make a polymer. For example, the monomer of natural rubber is isoprene. Monomers may be naturally occurring or synthetic. *See also* **Polymerization**.

MSDS. *See* **Material Safety Data Sheet (MSDS)**.

Mutagen. A chemical or radiation source that alters an organism's DNA, affecting transmission of inherited characteristics from one generation to the next.

N

NAICS. North American Industry Classification System. An industry classification system. *See* www.library.georgetown.edu/swr/business/naics-lin.htm. *Compare with* **SIC**.

National Institute for Occupational Safety and Health (NIOSH). The Federal agency responsible for conducting research and making recommendations for the prevention of work-related disease and injury. NIOSH is part of the Centers for Disease Control and Prevention (CDC). (website: www.cdc.gov/niosh)

National Response Center (NRC). The central Federal clearinghouse for information on hazardous chemical spills and other oil or hazardous substance releases. Responsible parties should contact the NRC in order to fulfill reporting requirements for spills of oil and hazardous substances (hotline: 1-800-424-8802; NRC website: www.nrc.uscg.mil).

National Response Team (NRT). A planning, policy, and coordinating body consisting of representatives from 16 federal agencies with interest and expertise in aspects of emergency response to pollution incidents. The NRT provides national level policy guidance prior to an incident and can provide assistance during an incident. (website: www.nrt.org)

Navigator. The small window accessible from any CAMEO module (click the "Navigator" toolbar button). Click buttons on the Navigator to display any CAMEO module, ALOHA, or MARPLOT, or to search for a chemical or facility record.

Nematicide. A pesticide employed to kill nematodes (a type of worm common in soil and water).

Neutralization/Neutralize. The reaction between an acid and base to form a salt and water. Neutralization is often rapid, vigorous, and exothermic (heat-producing).

NIOSH. *See* **NAICS**.

NOAA. National Oceanic and Atmospheric Administration. (website: www.noaa.gov)

Noble gases. A group of six elements (helium, neon, argon, krypton, xenon, and radon) exhibiting little or no chemical reactivity.

Non-combustible. Non-reactive with air, even at very high temperatures.

Nonoxidizing. Completely or nearly lacking the ability to oxidize (to transfer oxygen to other groups or lose electrons to other groups).

NO_x. The oxides of nitrogen, taken as a group. Nitrogen forms several distinct compounds with oxygen; some of these compounds convert back and forth readily under ordinary conditions.

NRC. *See* **National Response Center (NRC)**.

NRT. *See* **National Response Team (NRT)**.

NRT-1. *See* **Hazardous Materials Emergency Planning Guide**.

Nucleophile. A chemical reactant that tends to react at centers of positive charge.

O

Occupational Safety and Health Administration (OSHA). Federal agency within the U. S. Department of Labor with the responsibility of ensuring worker safety and health. (website: www.osha.gov)

Olefin. An alkene. *See also* **Alkene**.

Oleum. Or **fuming sulfuric acid**. The mixture of sulfuric acid and sulfur trioxide.

Organic. Generally, compounds that contain the element carbon, except for some carbon-containing compounds that are considered to be inorganic (carbon oxides, carbides, carbon disulfide, phosgene, the cyanides of the metals, and carbonyl sulfide). *Contrast with* **Inorganic**.

OSHA. *See* **Occupational Safety and Health Administration (OSHA).**.

Oxidation. A chemical reaction in which oxygen bonds to an element or compound. By extension, a reaction in which one element or compound rises to a higher oxidation state while another drops to a lower oxidation state (the term is used in this sense even when no oxygen whatever is present). *Contrast with* **Reduction**.

Oxidation number. An arbitrary number assigned to an atom in a compound. Oxidation increases the total oxidation number of the atoms in a compound; reduction reduces it.

Oxidizing agent. A material capable of bringing about oxidation (the loss of electrons) in other materials, while it is itself reduced (gains electrons). *Contrast with* **Oxidizing agent**.

P

Parent module. A CAMEO module located above another, related module in CAMEO's file hierarchy. Facilities and Routes are parent modules relative to the Chemicals in Inventory module.

Peroxidizable. Apt to react spontaneously with oxygen at room temperature, to form peroxides and other products. Most such autooxidations are accelerated by light or by trace impurities. Because many peroxides are explosive, peroxidizable compounds are especially hazardous. Ethers and aldehydes are particularly peroxidizable.

Person. In the context of EPCRA, any individual, trust, firm, joint stock company, corporation (including a government corporation), partnership, association, State, municipality, commission, political subdivision of State, or interstate body.

pH. A number indicating the acidity or alkalinity of an aqueous solution, defined as the negative logarithm of the hydrogen ion concentration in moles per liter. At room temperature, a solution having a pH of 7 is neutral (neither acidic nor basic). Solutions with pHs greater than 7 are basic (alkaline); solutions with pHs below 7 are acidic.

Phosphorescence. A luminescent (light-emitting) quality of many substances and living organisms (such as fireflies and sea pansies). *Compare with* **Fluorescence**.

Polycyclic. Compounds having structures with two or more carbon-containing rings.

Polymer. The product of polymerization. Proteins, starches, cellulose and natural rubber are naturally occurring polymers; polystyrene, nylon, Teflon, and synthetic rubber are synthetic polymers. *See also* **Polymerization**.

Polymerizable. Capable of undergoing polymerization, an energy-releasing self-reaction. The products of polymerization reactions are generally less reactive than the starting materials. *See also* **Polymerization**.

Polymerization. A chemical reaction in which a large number of smaller molecules (monomer units) join together by chemically linking into chains or networks (polymers). Energy is released during polymerization reactions. *See also* **Polymer**.

ppb. Parts per billion. Units used to express the concentration of a gas or vapor in air (as molecules of chemical per billion molecules of air).

ppm. Parts per million. Units used to express the concentration of a gas or vapor in air (as molecules of chemical per million molecules of air).

Prill. Small spherical or cylindrical pellets used in the fertilizer and explosive industry, because they are

convenient to handle. An example is ammonium nitrate prills, which are often coated with a wax because this salt has a tendency to cake when hydrated.

Pyrophoric. Any substance that ignites in the presence of air at or below ambient temperatures. Many pyrophoric materials react with moisture in the air to generate flammable hydrogen gas and enough heat to ignite the hydrogen. These are extremely dangerous fire hazards that are generally stored under an inert atmosphere or in a solvent like ether or kerosene that excludes air.

Pyrotechnics. The manufacture of fireworks, signal flares, and so on, involving the mixture of different chemicals to achieve various visual and auditory effects. Chemicals used in pyrotechnics include many explosive inorganic compounds such as potassium nitrate, metal perchlorates, dichromate, powdered metals, and phosphorus.

Q

Quaternary ammonium salt. Ammonia derivatives in which four alkyl or aryl groups are attached to a nitrogen atom. When ionized in aqueous solution, acts as an antibacterial, antistatic agent, and an accelerant in photographic development.

R

Radiation. Electromagnetic energy or light, depending on the wavelength, which imparts energy to molecules and atoms. Radiation absorption causes ionization and bond-breaking.

Radical. In inorganic chemistry, refers to an aqueous, dissociated ionized group. In organic chemistry, refers to an uncharged alkyl, aryl, or other group that acts as a fragmented, highly reactive, short-lived substance. Free radical generation is a very important reaction that can initiate polymerization and other kinds of reactions.

Radioactive. Spontaneously and continuously emitting ions or ionizing radiation. Radioactivity is not a chemical property, but an additional hazard apart from other properties of a material.

Radius of a threat zone. The maximum distance away from the point of release of a hazardous substance at which its airborne concentration could reach the LOC (level of concern), under specified weather conditions. *See also* **LOC**, **Threat zone**.

Rapid reaction. A reaction in which chemical change becomes evident within minutes to hours after the mixing of incompatible chemicals. That evidence can be dramatic change such as fire or explosion, or more subtle effects, such as chemical heat production, evolution of gases, or deposition/disappearance of solids.

Rare. Can refer either to the noble gases (helium, neon, and argon), the rare-earth elements (or lanthanide series, starting with lantanum), or rare metals such as gold, silver, cadmium, and platinum.

Reactive. A hazard category that includes chemicals described as unstable, reactive, organic peroxide, or water-reactive (described in 29 CFR § 1910.1200).

Reactive group. Reactive groups are categories of chemicals that react in similar ways because they are similar in their chemical structure. For purposes of predicting reactivity between mixed chemicals, each substance in the Chemical Library has been assigned to one or more reactive groups, based on the known chemistry of that substance. (See "How CAMEO predicts mixture reactivity" on page 94).

Reactive hazard. Some chemicals pose special or acute reactivity-related hazards that are intrinsic to

those chemicals because of their structures and known physical characteristics. Those hazards are listed under the Reactive Hazards tab on the Chemical Library record for any substance in CAMEO. Such special reactive hazards include a chemical's tendency to be flammable, explosive (either by itself or when mixed with other materials), peroxidizable, polymerizable, air- and or water- reactive, radioactive, or a strong oxidizer or reducer.

Reactivity. The tendency of a substance to take part in chemical change. The reactivity of most kinds of substances depends on the temperature and pressure of the surroundings, and on the identity and physical form of other chemicals with which a given substance is in contact. In contrast, innately reactive substances include those that react rapidly with water, air, and other common components of the environment under ordinary conditions, as well as substances that self-react (decompose or polymerize) under ordinary conditions.

Reagent. Any chemical substance used in chemical analysis.

Record. In any CAMEO module, each record describes an important entity or element of information. E.g., each record in the Chemical Library describes a particular substance; each Facilities record describes a single facility (or department within a large facility). Each record contains datafields, each of which stores a particular kind of information (e.g., Chemical Name is a data field on a Chemical Library record). *See also* **Database**.

Record view. View of a single record within a CAMEO module, in which you can access all the information contained in that record (typically, you clicks tabs to see different kinds of information in a record). *Contrast with* **List view**.

Redox. A contraction for "oxidation-reduction." Redox reactions, in which electrons are transferred from a reducing agent to an oxidizing agent, are a major category of chemical change.

Reducing agent. A substance that can bring about reduction (gaining of electrons) in other substances, while it is itself oxidized (loses electrons). *Contrast with* **Oxidizing agent**.

Reduction. A reaction in which either oxygen is removed from a substance or, in a more general sense, one or more electrons is accepted from another substance. (Can also mean a process in metallurgy by which materials are separated into their wanted and unwanted components from an ore body.) *Contrast with* **Oxidation**.

Reportable quantity (RQ). The quantity of a hazardous substance or extremely hazardous substance that, if released, must be reported to the National Response Center, the State Emergency Response Commission, and the community emergency coordinator for areas likely to be affected by the release. See "Section 304: emergency notification" on page 270.

Resins. Naturally-occurring "essential oils" that are water-insoluble and extracted from natural sources, such as trees and shrubs. Also, synthetic polymers such as polystyrene or polyethylene, even though such materials are not complex mixtures of compounds like other resins, but instead are long, complex polymers.

Response Information Data Sheets (RIDS). In a Chemical Library record, a set of detailed descriptions of chemical properties, hazards, and emergency response information.

RIDS. *See* **Response Information Data Sheets (RIDS)**.

Risk analysis. A systematic method of assessing the damage that could be caused to a community by a hazardous substance release.

RQ. *See* **Reportable quantity (RQ)**.

S

Salt. An ionic compound derived from the combination of cations (positively-charged ions) with anions (negatively-charged ions). Sodium chloride (common table salt) is an example.

SARA. *See* **Superfund Amendments and Reauthorization Act of 1986 (SARA)**.

Saturated. Refers to organic compounds that contain the maximum possible number of hydrogen atoms per carbon atom. Also used to describe a solution of a solute that is at its solubility limit in a given solvent system at a specified temperature. *Contrast with* **Unsaturated**.

Screening zone. Threat zone for screening calculations.

Search collection. A type of **found set**. When you perform a search or request information on linked MARPLOT objects, CAMEO collects together the records in the given module that meet your criteria. You then can browse through the collected records. While a search collection exists, you can move among only the collected records. Before you can work with other records in the module, you must clear the search collection (choose Clear Search from the Search menu). *See also* **Found set**.

Search criteria. The criteria, or conditions, that you set when you search a CAMEO module for a specific piece of information, such as the record for a particular chemical in the Chemical Library.

SERC. *See* **State Emergency Response Commission (SERC)**.

Sharing. The process by which CAMEO, ALOHA, and MARPLOT share information in order to establish and use links between module records, map objects, and ALOHA footprints.

Shock wave. A pressure wave generated by an explosion.

SIC. Standard Industrial Classification. SIC codes are assigned to U.S. industries. Facilities with SIC codes 20 to 39 (manufacturers) may be subject to the hazardous chemical inventory reporting requirements of EPCRA.

Skin absorption. Chemical exposure through the skin. Because the skin does not act as a reliable barrier to hazardous chemicals, it can be a route of acute poisoning. Compounds such as dimethyl sulfoxide are known to be directly absorbed into the bloodstream through the skin.

Sludge. A thick or viscous mixture of solids in aqueous solution, such as sewage sludge.

Slurry. A dilute mixture or suspension of solid particles in water, such as clay, fiber, or metal powders.

Soda ash. Sodium carbonate.

Solute/Solvent. A solute is a gas, liquid, or solid substance that is uniformly dispersed in a liquid solvent substance, forming a solution. The solvent molecules act to break the solute molecules' attraction for one another, and also the solvent's natural structure. For instance, water is a highly-structured substance, in the absence of any solutes. *See also* **Solution**.

Solution. A molecularly uniform mixture of one or more solutes in a solvent. Sometimes, one or more of the solutes are ionized in solution. *See also* **Solute/Solvent**.

Special locations. Locations of people who may be more susceptible to the toxic effects of an accidental release than the general population, because of pre-existing health conditions, age, or other factors. Schools, day-care centers, and nursing homes are examples of special locations.

Specific gravity. The ratio of the density of a substance at a given temperature to the density of water at the same temperature. A substance with a specific gravity greater than 1.0 will sink rather than float in water. *See also* **Density**.

Spectroscopy. The qualitative and quantitative analysis of emitted and absorbed energy, done by subjecting a substance to electromagnetic energy. The wavelength of this excitation energy can vary from gamma and x-ray to radio frequency.

Stabilizer. Any substance that, when added to another, acts to prevent or retard chemical or physical change in the latter. Examples include antioxidants, inhibitors, and emulsifying agents.

Starch. A carbohydrate or polysaccharide polymer composed of amylose and amylpectin. Starch occurs in plant tissues such as potatoes, tapioca, and rice, and is used as a thickening agent in foods.

State. Any State of the United States, as well as the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, and any other territory or possession over which the United States has jurisdiction.

State Emergency Response Commission (SERC).

A commission appointed by each State governor under EPCRA. A SERC designates emergency planning districts, appoints local emergency planning committees (LEPCs), supervises and coordinates the activities of planning committees, reviews emergency plans, receives chemical release notifications, and establishes procedures for receiving and processing requests from the public for information. *See also* **Local Emergency Planning Committee (LEPC)**.

State Fields. Records in the Facilities and Chemicals in Inventory modules contain a State Fields section, designed to support the emergency planning work of U.S. states that have developed their own reporting requirements, in addition to the Tier II requirements specified in EPCRA (which apply to all 50 states). In these states, Tier II forms contain additional data fields, called "State Fields" in CAMEO. CAMEO's State Fields, located under the State Fields tab, provide a place where people working in these states can maintain their reporting information.

STCC. Standard Transportation Commodity Code. Seven-digit code used to identify chemicals by the Association of American Railroads.

Strong oxidizing agent. Oxidizing agents gain electrons from other substances and are themselves thereby chemically reduced. Strong oxidizing agents accept electrons particularly readily from many other substances. The ensuing redox reactions may be vigorous or violent and may release new substances that may take part in further additional reactions. Keep strong oxidizing agents well separated from strong reducing agents.

Strong reducing agent. Reducing agents give up electrons to other substances, and are themselves thereby oxidized. Strong reducing agents donate electrons particularly readily to many other substances. The ensuing redox reactions may be vigorous or violent and may generate new substances that take part in further additional reactions. Keep strong reducing agents well away from strong oxidizing agents.

Sublime. The change of a substance from the solid state to the vapor state, without passing through the liquid intermediate state. Substances that sublime include solid carbon dioxide, sulfur, camphor, and naphthalene.

Sudden release of pressure. A hazard category that includes explosives and compressed gases (described in 29 CFR § 1910.1200).

Superfund. The trust fund established under CERCLA to provide funding for cleanup of hazardous substances.

Superfund Amendments and Reauthorization Act of 1986 (SARA). Title III of SARA is also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). *See also* **Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)**.

Surfactant. A substance that reduces surface tension of liquids. Nearly synonymous with detergent (which reduces the surface tension of water), wetting agent, and emulsifier.

Suspension. A uniformly-dispersed mixture of fine particles in a liquid.

Synonyms. In CAMEO, a single chemical may have many names. The synonyms by which a chemical is named can include common names in different languages, trade names, and other names.

T

Technical grade. Term applied to substances that are unrefined, impure, and/or less than 100% pure grade.

Technical Guidance. *Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances.* A guidebook for use by members of Local Emergency Planning Committees (LEPCs) in assessing the potential risks to a community from accidental airborne releases of extremely hazardous substances. See "Bibliography" on page 276.

TEELs. Temporary Emergency Exposure Limits. TEELs are temporary levels of concern, defined by the U.S. Department of Energy for use when ERPGs aren't available. *See also* **ERPG**.

TEEL-1. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor. *See* **TEELs**.

TEEL-2. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action. *See* **TEELs**.

TEEL-3. The maximum airborne concentration [of a toxic gas] below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects. *See* **TEELs**.

Thermoplastic. Any substance that is solid or semi-solid at room temperature, but becomes liquid when heated. Thermoplastic substances can be molded or shaped and hold their shape until heated. Examples include butter, waxes, and certain polymers.

Threat zone. A threat zone encloses the area around the location of a hazardous chemical release, within which concentrations of the chemical could reach or exceed a specified LOC (level of concern). *See also* **LOC**.

Threshold Planning Quantity (TPQ). The amount of an extremely hazardous substance present at a facility, above which the facility's owner/operator must give emergency planning notification to both the appropriate SERC and LEPC. TPQs are defined in 40 CFR § 355. See "Section 301-303: emergency planning" on page 268.

Tier II. Facilities covered by EPCRA must submit a hazardous chemical inventory form to the LEPC, the SERC, and the local fire department annually. Facilities provide either a Tier I or Tier II form. Most States require the Tier II form. See "Sections 311 and 312: community right-to-know requirements" on page 270.

Title III. Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III) is also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). *See* **Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)**.

TPQ. See Threshold Planning Quantity.

U

Unlink. A command which breaks a link previously established between a CAMEO record and an object on a MARPLOT map. *Contrast with* **Link**.

UN/NA number. Or **UN number**. A chemical identification number, assigned under a numbering system developed by the U.S. Department of Transportation. This system has since become the United Nations standard system for classifying hazardous materials.

Unsaturated. Refers to organic compounds that contain fewer than the maximum possible number of hydrogen atoms per carbon atom. *Contrast with* **Saturated**.

Upper Explosive Limit (UEL). The highest concentration of a flammable vapor in air at which explosion or combustion can occur. Above this concentration, the vapor-air mixture is too rich to combust. *See also* **Lower explosive limit (LEL)**.

UV. Abbreviation for Ultraviolet radiation.

V

Vapor density. The ratio of the density of a gas to the density of air at the same temperature. A gas with a vapor density greater than 1.0 is heavier than air and will sink in the atmosphere. *See also* **Density**.

Vapor pressure. In a closed system containing an evaporating liquid and its vapor, the equilibrium at which the number of vapor molecules reentering the liquid equals the number going from the liquid to the vapor phase. Vapor pressure is commonly expressed in pressure units of either millimeters of mercury (mm Hg), pounds per square inch (psi), or atmospheres (atm).

Viscosity. The tendency of a liquid substance to resist movement or flow due to an external force applied to it.

Volatile/Volatility. Refers to the ease with which a substance goes from liquid or solid phase to the vapor phase (via evaporation or sublimation). The volatility of a given substance increases with temperature.

Vulcanization. The industrial process by which rubber is allowed to "cross-link" to form disulfide bonds between molecules. Vulcanization improves the durability of the rubber product.

Vulnerable zone. Threat zone for scenarios calculations. *See also* **Threat zone**.

W

Water of crystallization. Water chemically combined within a crystalline substance.

Water-reactive. Substances that may react rapidly or violently with liquid water and steam, typically forming toxic and/or flammable products and heat.

Water solubility. Mixing of gas, liquid, or solid materials in water. The highest amount of a particular material that can be mixed in water is its water solubility. Water solubility ranges shown in Chemical Library records are as follows: Water insoluble: <1 mg/ml; Slightly water soluble: 1-10mg/ml; Water soluble: >10 mg/ml.

Wettable powder. A solid material whose surface is hydrophilic, and therefore attracts water.